

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 1
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

PERMIT TO OPERATE EVALUATION

COMPANY NAME: Johnson Laminating & Coating Inc.

EQUIPMENT ADDRESS: 20631 Annalee Ave.
Carson, CA 90746

MAILING ADDRESS: SAME

FACILITY ID: 014492

APPLICATION NO. 517617 PC (Replacement of Permit #F91633, Application #447575)

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. REGENERATIVE THERMAL OXIDIZER, TANN CORPORATION, MODEL TR 2088, 33'-6" W. X 28'-4" L. X 18'-10" H., WITH TWO CERAMIC BED HEAT RECUPERATORS, NATURAL GAS INJECTION AND ONE 4,600,000 BTU PER HOUR MAXON KINEDIZER LE 4" START-UP BURNER..
2. EXHAUST SYSTEM, WITH ONE EXHAUST BLOWER, 125 HP, AND 20,000 SCFM CAPACITY, VENTING THE COATING, LAMINATING AND DRYING SYSTEM AND MIXING ROOM THROUGH FOUR PERMANENT TOTAL ENCLOSURES (PTE) AS DESCRIBED BELOW:
 - A. PTE #1 WITH A 10 HP EXHAUST BLOWER VENTING:
 - 1) TWO COATING STATIONS AND ONE LAMINATOR
 - 2) TWO OVENS, #1 AND #2 WITH A 15 HP EXHAUST BLOWER COMMON WITH OVEN #3.
 - B. PTE #2 WITH A 10 HP EXHAUST BLOWER (COMMON WITH PTE #3) VENTING:
 - 1) TWO COATING STATIONS AND ONE LAMINATOR
 - 2) TWO OVENS, #3 AND #4 WITH A 15 HP BLOWER COMMON WITH OVEN #2.
 - C. PTE #3 WITH A 10 HP EXHAUST BLOWER (COMMON WITH PTE #2) VENTING:
 - 1) ONE COATING STATION
 - 2) ONE OVEN #5, UV OR INDIRECTLY HEATED AND EXHAUSTED BY OVEN #3 OR #4.
 - D. PTE #4 WITH A 5 HP EXHAUST BLOWER VENTING:

MIXING ROOM CONTAINING BATCH TYPE MIXING VESSELS LESS THAN 251 GALLONS CAPACITY WITH NO SUPPLEMENTAL HEAT ADDED (RULE 219 EXEMPT)

APPLICATION NO. 517618

"Deminimis Significant Title V permit revision" Plan – 2nd Revision

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 2
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

BACKGROUND

Johnson Laminating submitted one application for Permit to Construct, to replace the APC system along with one Title V revision application on 12-23-2010. The company is planning to replace the existing set of two RTOs under a/n 447575(p/o F91633) with a new RTO manufactured by TANN industry venting the three existing permanent total enclosures (PTEs). The manufacturer of the RTO will install a low NOx burner for start-up (gas injection once operating), and is assuring 30 ppm NOx at start up by modifying the start up process. The facility is also replacing the two 60 HP exhaust blowers with a new 125 hp 20,000 SCFM blower. The applicant is adding a mixing room with Rule 219 exempt mixers as the fourth PTE venting to the new RTO. This new PTE and start-up burner will be part of the source test requirement. There is no change in the basic coating and laminating line operating in three PTEs under a/n 447574, p/o no. F91632.

Permanent Total Enclosures PTEs for the existing permitted coating/laminating system and the additional fourth PTE with rule 219 exempt equipment will be vented to the new RTO with expected capture efficiency of 100%. Presently the facility has a VOC emission cap of 750 lbs/day. The company previously conducted source tests on the existing PTEs and confirmed that they meet the requirements of EPA method 204 with capture efficiency at 100%. With the addition of the fourth PTE, the capture efficiency is expected to remain at 100%. The total flow rate to the RTO from the four PTEs (out of which three are existing PTEs and the fourth PTE is new) is 20,000 CFM which is equivalent to the RTO capacity. The minimum operating temperature of the RTO will be 1500 °F.

This is a Title V facility, and Title V permit renewal was issued to this company on July 9, 2006. This is the second revision since the renewal.

The maximum operating schedule for this facility will be 24 hrs/day, 7 days/wk, 52 weeks/yr. The District database shows that the applicant has not received any odor nuisance complaints from the public. Review of the District Compliance database show that the inspector issued NOV#P50716 on 6/18/2009 for failure to submit semiannual report for the second half of year 2008. The issue has been resolved. The NOV was closed on 12-3-2009.

PROCESS DESCRIPTION

This company manufactures solar control window film (window-tinting film) through coating and laminating processes with organic solvent-based adhesive. All of the coating/laminating processes take place in dip tanks (coating stations) within PTEs. The coating/laminating system consists of five stations in three sections and the company has the operational flexibility of using one or all of the coating/laminating sections based on product specifications. Normally, the first two stations are used to apply stretch resistant coatings on the film followed by two dryers (1 & 2), the third and fourth stations are for laminating (two layers of film are laminated together) with two dryers, and the fifth station is an adhesive coating process (enables the film to glue to the window) with one dryer. The final products are used for tinting commercial/residential building windows. The facility has two active permits, one for

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 3
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

the adhesive coating/laminating system and the other is for the APC system with two oxidizers venting the coating/laminating system. The company installed three separate permanent total enclosures (PTEs) around the coating and laminating system. The fourth PTE will be exhausted to the main header.

The RTO will handle 15,000 scfm from the three PTEs of the permitted coating line and up to 5,000 scfm from the mixing room for a total of 20,000 scfm.

Description of the fourth PTE:

The mixing room is a permanent total enclosure (PTE) with inside dimensions of 29'-0" x 25'-6" x 22'-0" average ceiling height. It contains three batch type mixing vessels, all of which are less than 251 gallon capacity, has no supplemental heat added and accepts no ingredient above 135 °F which, renders them exempt from requiring a permit under Rule 219 (k)(4). The vessels are always sealed with covers in place except when adding materials to the batch for very short periods of time. On completion of mixing, the sealed vessels are manually wheeled into the coating line PTEs where the contents are pumped to the coating heads.

Fresh air is pulled into the mixing room from roof level via a filter box and exhausted via a floor sweep behind the mixing vessels and ducted through the roof to a dedicated roof mounted exhaust blower. Discharge from the blower is directed to the main header from the coating line which carries the combined flow of fumes to the RTO.

There will be no change to the existing PTEs no. 1, no. 2 and no. 3.

EMISSION CALCULATIONS:

RTO Design:

Design capacity of the control equipment:	20000 scfm
Inlet operating temperature (from RTO mfg.)	110 ⁰ F (Conservative)
Outlet operating temperature from combustion chamber	1500 ⁰ F
Heat exchanger efficiency (from RTO mfg.)	88%
Heat Input Rating of the burner for initial heating of the media	4.6 mm BTU/HR
Heat required during the normal working load	by gas injection
Volume of the combustion zone	990 ft ³

Heat required to heat air from 110 °F to 1500 °F

$$M = 20,000 \text{ scfm} \times 0.075 \text{ lb/scf} \times 60 \text{ min/hr} = 90,000 \text{ lb/hr}$$

$$Cp_{110} = 0.240 \text{ Btu/lb } ^\circ\text{F} \quad Cp_{1500} = 0.2525 \text{ Btu/lb } ^\circ\text{F}$$

$$Cp_{\text{avg}} = 0.246 \text{ Btu/lb } ^\circ\text{F}$$

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 4
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

$$\begin{aligned}
 Q &= MC_p \Delta T \\
 &= 90000 \times 0.246 \times (1500 - 110) \\
 &= 30.77 \text{ MM Btu/hr}
 \end{aligned}$$

After 88% heat recovery

$$Q = 30.77 \times 0.12 = 3.69 \text{ MM Btu/hr}$$

This being an RTO, no excess air is necessary for most of the time during the oxidation of the VOC. Contaminated airflow is sufficient to provide the necessary air. The applicant will use the burner only to start-up the RTO. The natural gas injection and the VOCs will maintain the temperature in the combustion chamber. The RTO will have a burner rated at 4.6×10^6 Btu/hr for start-up, which is sufficient to fire-up the RTO. A permit condition will be imposed requiring a source test upon completion of the installation, which will prove the VOC control efficiency and NO_x concentration.

Residence time calculation

$$\text{Total flow rate} = 20,000 \text{ scfm}$$

$$\text{Air Temp} = 1500^\circ\text{F}$$

$$\text{Actual air volume} = 20,000 \text{ SCFM} \times 1960/570 = 68,772 \text{ cu. ft.}$$

Combustion chamber dimensions

$$\text{Height} = 6.26 \text{ ft}$$

$$\text{Length} = 19.25 \text{ ft}$$

$$\text{Width} = 8.08 \text{ ft}$$

$$\text{Volume} = 990 \text{ cu. ft.}$$

$$\text{Residence time} = 990/68,772 \times 60 = 0.86 \text{ sec (greater than 0.3 sec recommended - OK)}$$

For calculation of combustion emissions, 180 minutes(3 hours) will be the maximum usage for the RTO start-up operations which may be a few times a week at most. Three hours will be counted from the cold start-up. The RTO will be equipped with a Maxon Kinedizer LE burner with 30 ppm NO_x emissions @ 3% O₂. Please see following table for combustion emission calculations.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 5
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

Afterburner (RTO)- From the cold start-up burner

@

	<u>maximum</u>	<u>normal</u>		
<u>hr/dy</u>	3	3	<u>max heat input</u>	4.60E+06 (BTU/hr)
<u>dy/wk</u>	7	7	<u>gross heating value</u>	1050 (BTU/scf)
<u>wk/yr</u>	52	52		
<u>load</u>	100%	100%		

	<u>Emission</u>	<u>MAX</u>	<u>AVE</u>	<u>MAX</u>	<u>30-DAY</u>	<u>MAX</u>	<u>MAX</u>
	<u>Factors</u>	(lb/hr)	(lb/hr)	(lb/dy)	(lb/dy)	(lb/yr)	(ton/yr)
SO ₂ (R1)	0.6	0.003	0.003	0.008	NA	3	0.001
SO ₂ (R2)	0.6	0.003	0.003	0.008	0.008	3	0.001
NO ₂ (R1)	38.94	0.171	0.171	0.512	NA	186	0.093
NO ₂ (R2)	38.94	0.171	0.171	0.512	0.512	186	0.093
CO (R1)	80	0.350	0.350	1.051	NA	383	0.191
CO (R2)	80	0.350	0.350	1.051	1.051	383	0.191
N ₂ O (R1)	2.2	0.010	0.010	0.029	NA	11	0.005
N ₂ O (R2)	2.2	0.010	0.010	0.029	0.029	11	0.005
PM, PM ₁₀ (R1=R2)	7.5	0.033	0.033	0.099	0.099	36	0.018
CO ₂ (R1=R2)	0.000012	0.000	0.000	0.000	0.000	0	0.000
TOC (R1=R2)	7	0.031	0.031	0.092	0.092	33	0.017
ethyl benzene	0.0095	4.2E-05	4.2E-05	1.2E-04	NA	4.54E-2	2.27E-5
acetaldehyde	0.0043	1.9E-05	1.9E-05	5.7E-05	NA	2.06E-2	1.03E-5
acrolein	0.0027	1.2E-05	1.2E-05	3.5E-05	NA	1.29E-2	6.46E-6
benzene	0.008	3.5E-05	3.5E-05	1.1E-04	NA	3.83E-2	1.91E-5
formaldehyde	0.017	7.4E-05	7.4E-05	2.2E-04	NA	8.13E-2	4.07E-5
napthalene	0.0003	1.3E-06	1.3E-06	3.9E-06	NA	1.44E-3	7.18E-7
PAH's	0.0001	4.4E-07	4.4E-07	1.3E-06	NA	4.78E-4	2.39E-7
toluene	0.0366	1.6E-04	1.6E-04	4.8E-04	NA	1.75E-1	8.75E-5
xylenes	0.0272	1.2E-04	1.2E-04	3.6E-04	NA	1.30E-1	6.51E-5

NO ₂ @ 3% excess O ₂ ----->>>	30.00	(ppmv)	SO ₂ @ 3% excess O ₂ ----->>>	0.33	(ppmv)
CO @ 3% excess O ₂ ----->>>	101.23	(ppmv)	PM @ 12% CO ₂ ----->>>	5.5E-09	(grain/ft ³)

Ver. 1.3

The new larger RTO unit with 4.6 mm BTU/HR heat input starter burner will replace two smaller 68 kw rated electric heaters for start-up.

Maxon will only guarantee the 30 ppm NO_x (corrected to 3% oxygen) if the burner firing rate is at or above ¼ of the rated firing rate. Thus, the RTO start up will be modified so the RTO burner will be set at a firing rate at or above ¼ the rated burner firing rate. The startup flow rate is typically ¼ or 1/5 of the rated RTO flow rate. Due to the modified firing rate, the startup flow rate may have to be modified and/or the startup operating parameters may have to be modified accordingly in order to meet the 30 ppm NO_x emission limit.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 6
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

There may be additional process NOx emissions from this operation. NOx emissions of 1 ppm maximum from the oxidation of the contaminated air inflow is expected from this operation. The NOx lbs/hr is calculated as follows.

$$\begin{aligned}
 \text{Lbs/hr} &= \text{PPM} \times \text{MW} \times 60 \times \text{SCF} / 379 \times 10^6 \\
 &= 1 \times 46 \times 60 \times 20,000 / 379 \times 1000000 \\
 &= 0.145 \text{ lbs/hr}
 \end{aligned}$$

In a day maximum 3 hrs will be for the start-up burner operation with a total of 0.512 lb of NOx emission. Hence, 24 – 3 = 21 hrs for the process NOx emissions @ 0.145 lb/hr.

Total NOx emission in a day = [0.145 x 21] + 0.512 = 3.557 lbs/day.

Toxic Compound Emissions and Risk Assessment

A Tier 2 Risk Assessment was performed to determine the health risk from the toxic air contaminants emitted from the RTO due to combustion of natural gas. The assessment calculated a cancer risk of 0.29 in a million (2.90E-07) for the residential receptor and 0.0923 in a million (9.23E-08) for a commercial receptor. The assessment also calculated both acute and chronic hazard index (HIA and HIC) and all were below 1. Thus, the Tier 2 risk assessment demonstrated compliance with the Rule 1401 requirements.

VOC Emissions:

The VOC emissions from the facility will be decreased since the fugitive VOC from the Rule 219 exempt mixing room will be collected by the new PTE and vented to RTO. There is no change in the three existing PTEs so no change in VOC emissions is expected. The company will operate the new RTO at a minimum temperature of 1500 °F so 95% destruction efficiency for VOC is expected.

PM₁₀ Emissions:

There are no PM emissions from this coating/laminating operation, since the coatings and adhesives are not atomized.

TOXIC EVALUATION:

The proposed project is not expected to increase any emissions of toxic air contaminants (except from the combustion of natural gas, as discussed earlier), since they will continue to operate under the existing facility VOC cap.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 7
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

RULE/REGULATION EVALUATION:

Rule 212 – Public Notification:

Rule 212(c)(1):

This section requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. This source is not located within 1,000 feet from the outer boundary of a school. Therefore, public notice will not be required by this section.

Rule 212(c)(2) & (g):

These sections require a public notice for all new or modified facilities which have on-site emission increases exceeding any of the daily maximums as specified in subdivision (g). There are emission increases not exceeding daily maximums due to this project. Therefore, public notice will not be required by this section.

LB/DAY	CO	NOX	PM10	ROG	LEAD	SOX
Max Limit	220	40	30	30	3	60
Increases	1	1	0	2	0	0

Rule 212(c)(3):

As indicated previously, this proposed project is not expected to cause an increase in MICR greater than 1 in million or HIA /HIC above 1. Thus, a public notice will not be required per this section.

Rule 401 –Visible Emissions:

The proposed project is not expected to result in visible emissions with proper operation of the equipment.

Rule 402 – Nuisance:

The proposed project is not expected to result in nuisance problems with proper operation of the equipment.

Rule 1128 – Paper, Fabric & Film Coating Operations:

The facility has stated that there are no changes in the coatings they use. The applicant is in compliance with these requirements by using the proper application method and an approved air pollution control system with a minimum collection efficiency of 90% and VOC destruction efficiency of 95%.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 8
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

Rule 1147 – NOx Reductions from miscellaneous sources:

The Maxon start up burner is expected to operate at 30 ppm NOx @ 3% O₂. This is under the rule limit of 60 ppm for process temperature of 1200 °F or above. A source test will be required to verify this while the start-up burner is on. Compliance with this rule is expected

Rule 1171 – Solvent Cleaning Operations:

The facility has stated that there are no changes in the coatings and clean-up solvents they use. The applicant is in compliance with these requirements by using an approved air pollution control system with a minimum collection efficiency of 90% and VOC destruction efficiency of 95%.

Regulation XIII – New Source Review:

Rule 1303(a) –Best Available Control Technology

The proposed replacement RTO's startup burner will operate at 30 ppm NOx @ 3% O₂ which complies with the NOx BACT requirement for an RTO. The new APC system will be limited to the same VOC collection and destruction efficiency as the old APC system so there will be no change in VOC emissions and BACT is not triggered.

Rule 1303(b)(1) - Modeling

The combustion emissions from the start-up burner are below the Table A-1 limits allowable emissions for < 5 mm Btu/hr sources. Modeling is not required.

NOx (lbs/hr)		PM10 (lbs/hr)		CO (lbs/hr)	
Allowed	Actual	Allowed	Actual	Allowed	Actual
0.31	0.171	1.9	0.033	17.1	0.35

Rule 1303(b)(2) –Emission Offsets

The proposed modification will result in an emission increase from the RTO of 1 lb/day NOx and 1 lb/day CO from the combustion of natural gas in the start-up burner. These emissions are exempt from offset requirements under Rule 1304(c)(4): Regulatory compliance.

Rule 1401 – New Source Review for Toxic Air Contaminants

A Tier 2 Risk Assessment was performed to determine the health risk from the toxic air contaminants emitted from the RTO due to combustion of natural gas. The assessment calculated a cancer risk of 0.29 in a million (2.90E-07) for the residential receptor and 0.0923 in a million (9.23E-08) for a commercial receptor. The assessment also calculated both acute and chronic hazard index risks and all the risks were below 1. Thus, the Tier 2 risk assessment demonstrated compliance with the Rule 1401 requirements.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 9
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

REGULATION XXX:

REGULATION XXX:

This facility is not in the RECLAIM program. The proposed project is considered as a “de minimis significant permit revision” to the Title V permit for this facility.

Rule 3000(b)(6) defines a “de minimis significant permit revision” as any Title V permit revision where the cumulative emission increases of non-RECLAIM pollutants or hazardous air pollutants (HAPs) from these permit revisions during the term of the permit are not greater than any of the following emission threshold levels:

Air Contaminant	Daily Maximum (lbs/day)
HAP	30
VOC	30
NOx	40
PM10	30
SOx	60
CO	220

To determine if a project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the Title V renewal permit shall be accumulated and compared to the above threshold levels. This proposed project is the 2nd permit revision to the Title V renewal permit issued to this facility on July 9, 2006. The following table summarizes the cumulative emission increases resulting from all permit revisions since the Title V renewal permit was issued:

Revision	HAP	VOC	NOx	PM₁₀	SOx	CO
1 st Revision Modified the coating and laminating system by installing three Permanent Total Enclosures PTEs vented to the APC (oxidizers) system: A/Ns 447574 & 447575	0	0	0	0	0	0
2 nd Revision: Replacement of the existing APC system under a/n 447575 with a new RTO and adding a fourth PTE under A/N 517617	0	0	1	0	0	1
Cumulative Total	0	0	1	0	0	1
Maximum Daily	30	30	40	30	60	220

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING & COMPLIANCE PERMIT APPLICATION PROCESSING AND CALCULATIONS	PAGES 10	PAGE 10
	APPL NOs. 517617-8	DATE 5/18/2011
	PROCESSED BY GS	CHECKED BY SMKE

Since the cumulative emission increases resulting from all permit revisions are not greater than any of the emission threshold levels, this proposed project is considered as a “de minimis significant permit revision”.

CONCLUSIONS/RECOMMENDATIONS

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a “de minimis significant permit revision”, it is exempt from the public participation requirements under Rule 3006 (b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not have any objections within the review period, a revised Title V permit will be issued to this facility, with a Permit to Construct for this equipment in Section D.